Salmonellosis

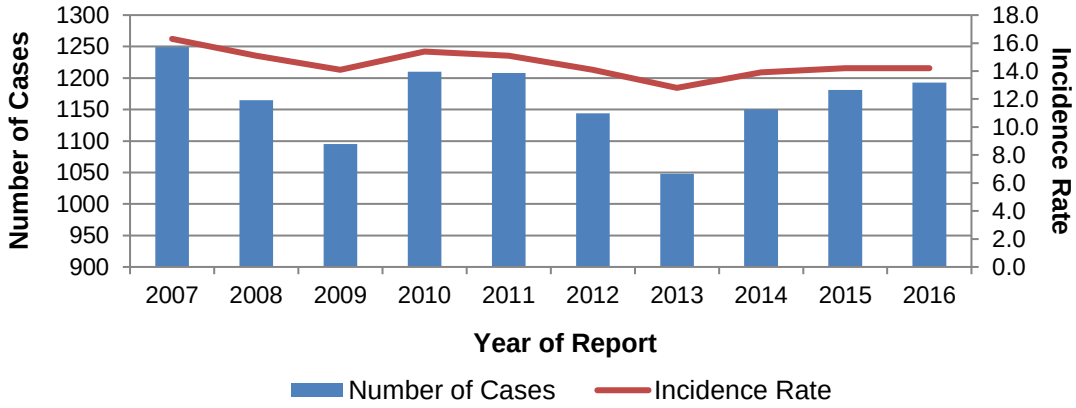
Agent: *Salmonella* (bacteria)
Mode of Transmission: Ingestion of contaminated foods (e.g., eggs and poultry products; fruit; vegetables) that have not been cooked enough to kill the germs, or by drinking contaminated water or milk. Infection can also occur after eating, smoking, or touching your mouth if hands are contaminated with the bacteria. Infected persons can also spread the bacteria if they do not wash their hands well after going to the bathroom and then handle food that other people eat. People can also be infected with *Salmonella* after contact with infected animals (especially poultry, pigs, cows, rodents, and pets such as lizards, turtles, chicks, ducklings, dogs, and cats).
Signs/Symptoms: Sudden onset of abdominal pain, diarrhea, fever, headache and sometimes vomiting. Dehydration, especially in older adults and young children, can be a severe complication.
Prevention: Preventive measures should include following proper sanitation methods for food preparation and water supplies, including preventing cross-contamination of food preparation surfaces; maintaining sanitary sewage disposal; excluding infected people from handling food or providing healthcare; prohibiting the sale of small turtles; and avoiding chicks, ducklings, turtles, and other reptiles as pets for small children. Proper hand hygiene should be practiced, including washing hands after toileting or diapering, before and after handling food, and after handling animals or their feces. Eggs and other animal food products should be cooked thoroughly.
Other Important Information: With approximately 42,000 salmonellosis cases reported each year in the United States, *Salmonella* is one of the leading pathogens that cause foodborne illnesses, many of which result in hospital admissions. Incidence rates are highest among infants and young children. Mortality rates are higher in infants, older adults and people with weakened immune systems.
Special Note about Salmonellosis: While more than 2,500 serotypes of *Salmonella* can cause human illness, two specific *Salmonella* serotypes (*S.* ser Typhi and *S.* ser Paratyphi*) can lead to typhoidal illness (i.e., typhoid fever and paratyphoid fever, respectively). Typhoidal illness is found only in humans and often results in more serious infections than those seen in other *Salmonella* serotypes; up to 10% of people who are untreated for typhoidal illness may die. Cases of typhoid fever and paratyphoid fever are usually associated with foreign travel and are alike in regard to clinical features and measures necessary to control the spread of infection. However, despite their similarities, paratyphoid fever tends to be milder than typhoid fever, with a lower mortality rate. Due to its severity, typhoid fever is reported as a separate condition in Virginia (see the Typhoid Fever section of this report for more information), while cases of paratyphoid fever are included in the general salmonellosis report.

* Paratyphoid fever can be caused by any of three separate strains of *S.* ser Paratyphi: *S.* ser Paratyphi A, *S.* ser schottmuelleri (also called *S.* ser Paratyphi B), or *S.* ser hirschfeldii (also called *S.* ser Paratyphi C). A separate strain of *S.* ser Paratyphi B (i.e., *S.* ser Paratyphi B var. L[+] tartrate [+]) causes illness that resembles non-typhoidal salmonellosis; these cases are treated as general salmonellosis and are not considered to be paratyphoid fever.

Salmonellosis: 2016 Data Summary	
Number of Cases:	1,193
5-Year Average Number of Cases:	1,146.2
% Change from 5-Year Average:	+4%
Incidence Rate per 100,000:	14.2

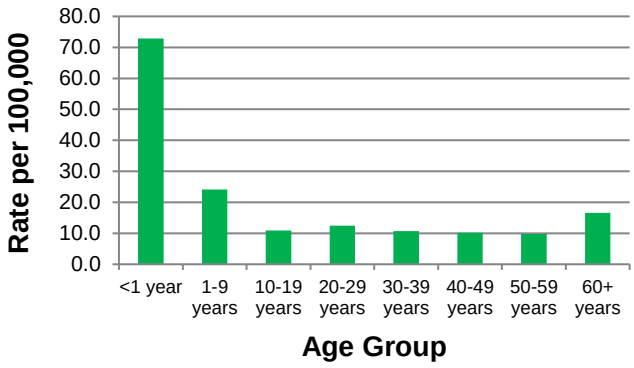
During 2016, 1,193 cases of salmonellosis were reported in Virginia. This is slightly higher than the 1,181 cases reported in 2015 and the five-year average of 1,146.2 cases per year (Figure 69).

Figure 69. Salmonellosis: Ten-Year Trend for Number of Cases and Incidence Rate, Virginia, 2007-2016



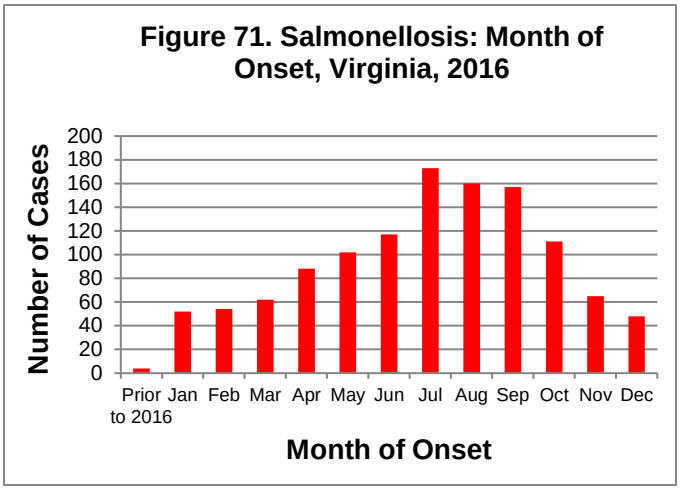
According to the CDC, infants and young children are most likely to be infected with *Salmonella*. This was observed in Virginia in 2016, with an incidence rate among infants of 72.9 per 100,000, which was considerably higher than any other age group (Figure 70). The incidence rate among children 1-9 years of age was 24.1 per 100,000 while rates in all other age groups ranged from 9.8 to 16.6 per 100,000. Race information was not reported for 38% of cases. Among those with a known race, incidence was higher in the white population (9.4 per 100,000) than the black and "other" race populations (7.7 and 6.6 per 100,000, respectively). By sex, incidence rates were higher among females than males (14.7 and 13.7 per 100,000, respectively).

Figure 70. Salmonellosis: Rate by Age Group, Virginia, 2016



The northwest region had the highest incidence rate (17.6 per 100,000), followed by the central region with 15.4 per 100,000. The remaining regions had rates ranging from 14.4 to 12.1 per 100,000, respectively. For incidence rates by locality, please see the map below. While *Salmonella* infections were reported in every quarter of the year, 41% of cases occurred during

the third quarter, peaking in July (Figure 71). One death, in a female over 60 years of age, was attributed to salmonellosis during 2016.



In 2016, twelve confirmed salmonellosis outbreaks were reported, nine of which were multistate outbreaks. Of the twelve outbreaks reported, six were foodborne and two were zoonotic. Transmission type was not confirmed in four of the twelve outbreaks. The number of Virginia residents affected during each outbreak ranged from 1 to 35. Of the foodborne outbreaks, one was linked to pistachios from California, two were associated with sprouts (bean and alfalfa), two were associated with leafy greens (salad mix), and one was associated with a restaurant outbreak. The two zoonotic outbreaks were attributed to contact with turtles and live poultry.

Salmonellosis cases identified in outbreaks and sporadic illness during 2016 were attributed to several *Salmonella* serotypes. The serotypes involved in the outbreaks included Montevideo, Muenchen, Enteritidis, Braenderup, Heidelberg, Typhimurium, and Saintpaul. Several different serotypes were identified and included in the zoonotic outbreaks. *Salmonella* ser. Enteritidis, Hadar, Indiana, Infantis, and Mbandaka were involved in the outbreak linked to live poultry, and Poona, Berta, Pomona, Litchfield, Agbeni, and Paratyphi B var. L[+] tartrate [+] were involved in the outbreak linked to turtles. For all salmonellosis infections in 2016, including sporadic cases among Virginia residents, the most common serotypes were *Salmonella* ser. Enteritidis and *Salmonella* ser. Typhimurium (Table 14).

Table 14. Top Ten *Salmonella* Serotypes Reported to the CDC PulseNet System by the Division of Consolidated Laboratory Services, Virginia, 2016

Rank	Serotype Causing Infection	Number		Rank	Serotype Causing Infection	Number
1	*S.* ser Enteritidis	225		6	*S.* ser Infantis	41
2	*S.* ser Typhimurium	194		7	*S.* ser Bareilly	33
3	*S.* ser Newport	151		8	*S.* ser I 4, 12:I:-	32
4	*S.* ser Javiana	96		9	*S.* ser Saintpaul	27
5	*S.* ser Braenderup	42		10	*S.* ser Heidelberg	27

Five cases of paratyphoid fever (*S.* ser Paratyphi A) were reported in Virginia during 2016. Four of the five affected individuals reported traveling internationally in the month prior to illness onset; countries visited by infected persons included Pakistan and Bangladesh.

Salmonellosis Incidence Rate by Locality
Virginia, 2016